WHAT IS CLAIMED IS:

1. An alignment system comprising:

a first module;

a first plurality of emitters located at defined locations on a face of the first module, positioned to emit signals of a known intensity distribution away from the face of the first module;

a first receiver configuration located on the face of the first module, having a known sensitivity distribution;

a second module;

a second plurality of emitters located at defined locations on a face of the second module, positioned to emit signals of a known intensity distribution away from the face of the second module;

a second receiver configuration located on the face of the second module, having a known sensitivity distribution;

a trigger signal generator configured to fire the first plurality of emitters of the first module in a predetermined pattern to generate signals sensed by the second receiver configuration of the second module, and to fire the second plurality of emitters of the second module in a predetermined pattern to generate signals sensed by the first receiver configuration of the first module;

a converter configuration arranged to obtain and convert the signals received by the first and second receiver configurations into data representative of the signals sensed by the receiver configurations ; and

a processing system configured to receive the data from the converter configuration, and to compute an offset between the faces of the first and second modules.

2. The system according to claim 1 wherein the offset is a six degree offset between the first module and the second module.

3. The system according to claim 1 wherein the computed offset is at least one of an absolute offset or a relative offset.

4. The system according to claim 1 wherein the first and second modules have at least six degrees of movement in the x, y, z, pitch, roll and yaw directions.

5. The system according to claim 1 wherein the offset information is used to align the first module and the second module.

6. The system according to claim 1 wherein the face of the first module further includes the plurality of first emitters being located at edges of the face, the first receiver configuration including first and second receivers located at approximately the mid-line and center of the face, and wherein the face of the second module further includes having the plurality of second emitters being located at corners of the four sided face, the second receiver configuration including first and second receivers located at approximately the mid-line and center of the face.

7. The system according to claim 6 wherein the plurality of first emitters are four emitters located at edges of the face, and the plurality of second emitters are four emitters located at edges of the face.

8. The system according to claim 1 wherein the face of the first module further includes having the first plurality of emitters and the first receiver configuration on the face of the first module consisting of emitter/receiver combinations at predetermined locations, and wherein the face of the second module further includes having the second plurality of emitters and the second receiver configuration on the face of the second module consisting of emitter/receiver combinations at predetermined locations.

9. The system according to claim 8 wherein the emitter/receiver pairs of the first module face and the emitter/receiver pairs of the second module face are configured wherein movement of the face plate of the first module toward the face plate of the second module results in a change in intensities of emitter signals received by the receivers of the first and second face plates.

10. The system according to claim 9 wherein the locations of the emitter/receiver pairs of the first and second face plates have a symmetry which permits alignment between the first and second modules when the modules are rotated with respect to each other.

11. The system according to claim 1 wherein the face of the first module and the face of the second module are configured to have a change in intensities of emitter signals as the modules move toward each other.

12. The system according to claim 1 wherein the first module and the second module are modules of a modular reconfigurable robotic system.

13. The system according to claim 1 wherein the first and second pluralities of emitters are commercial-off-the-shelf (COTS) infrared (IR) light emitting diodes, and the first and second receiver configurations are commercial-off-the-shelf (COTS) infrared receivers.

14. The system according to claim 1 wherein the first receiver configuration and the second receiver configuration detects ambient signals.

15. The system according to claim 1 wherein the processing system computes six degree offset through at least one of absolute position sensing and relative offset sensing.

16. An alignment method comprising:

configuring a first face of a first module to have a first plurality of emitters of a known intensity distribution, and a first receiver configuration having a known sensitivity distribution;

configuring a second face of a second module to have a second plurality of emitters of a known intensity distribution, and a second receiver configuration having a known sensitivity distribution;

activating the first plurality of emitters ;

detecting by the second receiver configuration a first set of signals from the first set of emitters;

activating the second plurality of emitters;

detecting by the first receiver configuration a second set of signals from the second set of emitters;

converting the first set of signals received by the first receiver configuration and the second set of signals received by the second receiver configuration, to digital data representative of the first and second sets of signals; and

processing the digital data to compute an offset between the face of the first module and the face of the second module.

17. The method according to claim 16 wherein the offset is a six degree offset between the first module and the second module.

18. The method according to claim 16 wherein movement of the first face plate toward the second face plate results in a change in intensities of emitter signals received by the receivers.

19. The system according to claim 16 wherein the first and second modules have at least six degree freedom of movement.

20. The system according to claim 16 wherein the locations of the emitter/receiver pairs of the first and second face plates have a symmetry which permits alignment between the first and second modules when the modules are rotated with respect to each other.